

Project For Elevating the City of Galveston

EVER since the great storm of 1900 in which the city of Galveston lost over 5,000 of her people and \$10,000,000 worth of property the bustling Texas port has been astonishing the world by a display of recuperative energy. Today the city is fairer and greater than it was before wind and wave combined to deal it such a crushing blow. Best of all, it is taking precautions to prevent the repetition of the horror of 1900, and in these precautions is involved an engineering work both unique and daring. Briefly, it is proposed to raise the level of a large portion of the city's area to such a height that, re-enforced by a huge sea wall now nearing completion, tidal waves may come and go without endangering the lives of the people of Galveston. And this work, he it noted, is to be carried on without interfering in any way with the commerce or traffic of the city. Such a condition would seem to present an insuperable difficulty, especially since the proposed level will in places be seventeen or eighteen feet higher than the present level, the average increased height being between seven and eight feet.

Apart from other considerations, the construction of the sea wall in itself makes elevation of the city's level a necessity. Rising to a height of seventy feet above the shore level, it will serve as a buffer to the angry gulf, but it will also put the territory behind it into a basin, offering vexatious problems of drainage and sewerage, to say nothing of the fact that should a record breaking tidal wave develop, the sea wall, preventing the recession of the water, would become a positive menace, forming a lake unless the elevation were raised. The question of how this should be done has been puzzling the brains of many engineers for months, tentative solutions being confronted with unanswerable objections. Now, however, a solution meeting every objection has been devised by a New York engineer, Lindon W. Bates, acting for Goodhart Brothers of Düsseldorf, Germany, and, their bid having been accepted by the Galveston grade raising commission, it is stated that work upon the project will be begun within a very short time.

The great difficulty from the contractors' standpoint has been where to get the material for filling in and how to distribute it cheaply enough to allow a profit. It was at first suggested to utilize self loading hopper dredges to carry sand to distributing stations on the sea front or bay front, but the objections to this were that the wave motion on the sea front and the danger from storms would render such a scheme impracticable. It was also said

that if the filling were distributed from the bay front it would be impossible to prevent a hindrance to traffic. Various other suggestions were advanced and dismissed. Then Mr. Bates hit upon the idea of digging a distributing canal parallel to and just inside of the sea wall. This not only met all objections, but offered some decided advantages. In the first place, the material for filling would be taken from the channels and navigable waters of the bay, deepening them to the benefit of shipping, an improvement worth, according to Mr. Bates, at least \$1,500,000. Then, again, the material excavated from the canal could be used to re-enforce the sea wall from the land side, the outer beach would not be disturbed, the filler could be distributed without an intricate relay system and consequent disturbance to business and, finally, large modern hydraulic dredges could be utilized. The work will be accomplished by hydraulic pressure, powerful ma-

chines pumping a mixture of sand and water into the area to be elevated, the water draining back into the canal through pipes. It is estimated that over 11,000,000 cubic yards of filling

will have to be dredged, carried and deposited over an area of about two square miles, and Mr. Bates is confident that the system he has devised will permit the work to be done eco-

nomically and expeditiously. Bonds to the amount of \$2,600,000 have been voted by the state to supplement the city's funds for the immense undertaking.

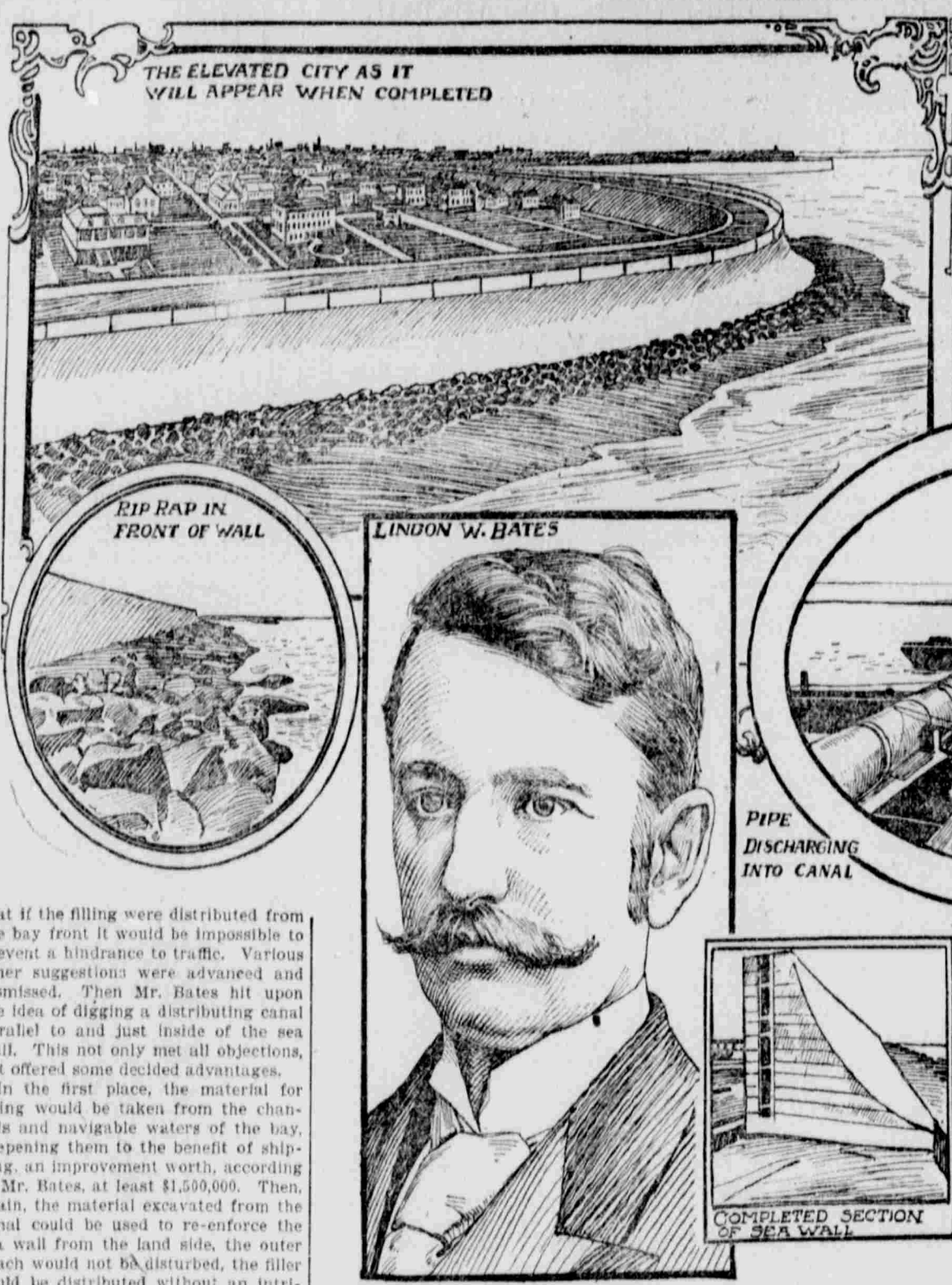
The portion of the city to be thus regraded is that which suffered most severely from the storm of 1900. Galveston is located upon the eastern end of an island of the same name about three miles wide by thirty-one miles long and boasting a bay that is rated one of the safest harbors along the Gulf or Atlantic seaboard. More than one-half of the city was submerged to a height of 15.7 feet above mean low water by the flood that swept in from the gulf. This same section had already suffered more or less severely by several great storms, notably in the years 1834, 1837,

beyond. The base of the wall will be protected by sheet piling and riprap. The sheet piling is heavy timber driven in a straight line outside the round piling of the wall and resting on the clay stratum beneath the beach, while the riprap consists of large pieces of granite piled promiscuously in front of the wall and extending into the gulf for a distance of nearly thirty feet from the wall. The wall itself is being built of granite concrete and rests on a foundation of the same concrete. When completed, at a cost of about \$1,500,000, it will be not only useful, but ornamental, and its appearance will be enhanced by a broad, paved driveway and sidewalk, which it is proposed to construct immediately back of it and on a level with its top, while behind the driveway, again, a strip sixty feet wide will be sowed with Bermuda grass. Seen from the deck of an approaching vessel, the prospect should be very attractive.

But this part of the work will necessarily be delayed by reason of Mr. Bates' canal idea. That this gentleman is well equipped to cope with the great difficulties that will assuredly confront him is evinced by a glance at his record. Although yet in the forties, Mr. Bates is widely known in the engineering world, having been connected with many big undertakings. A section of the Chicago drainage canal was dredged under his supervision; he has served as constructing engineer and manager of several railway dock and terminal enterprises; the Suez canal company has enlisted his services; the Belgian government has employed him as consulting engineer in connection with projects for the port of Antwerp; he has been of assistance to the Russian government in work on the Volga, Dnieper and Bug rivers, and, in collaboration with engineers designated by the governments of Russia, Germany, Austria and Belgium, he has prepared a project for the improvement of the port of Shanghai. For other services Mr. Bates has been decorated by the French government. It is stated that the whole of the engineering work entailed in the Galveston grade raising scheme will devolve upon him.

WELLMAN J. CURTICE.

MONSTER WAVES.
The size of the Atlantic waves has been carefully measured for the Washington hydrographic bureau. In height the waves usually average about thirty feet, but in rough weather they attain from forty feet to forty-eight feet. During storms they are often from 500 feet to 600 feet long and last ten or eleven seconds, while the longest yet known measured half a mile and did not spend itself for twenty-three seconds.



THE ELEVATED CITY AS IT WILL APPEAR WHEN COMPLETED

PIPE RAP IN FRONT OF WALL

LINDON W. BATES

PIPE DISCHARGING INTO CANAL

COMPLETED SECTION OF SEA WALL

FAMOUS JOE MILLER, THE JOKELESS JESTER.

The decision of the corporation of King's College hospital in London to remove that institution to another site has started people wondering what will become of the headstone of Joe Miller's grave, which is set against the wall of the hospital's main hall. It was given that post of honor on the fact that the hospital stands upon the site of the graveyard in which Joe Miller was buried. It may not be generally known, but it is a fact that Joe, who



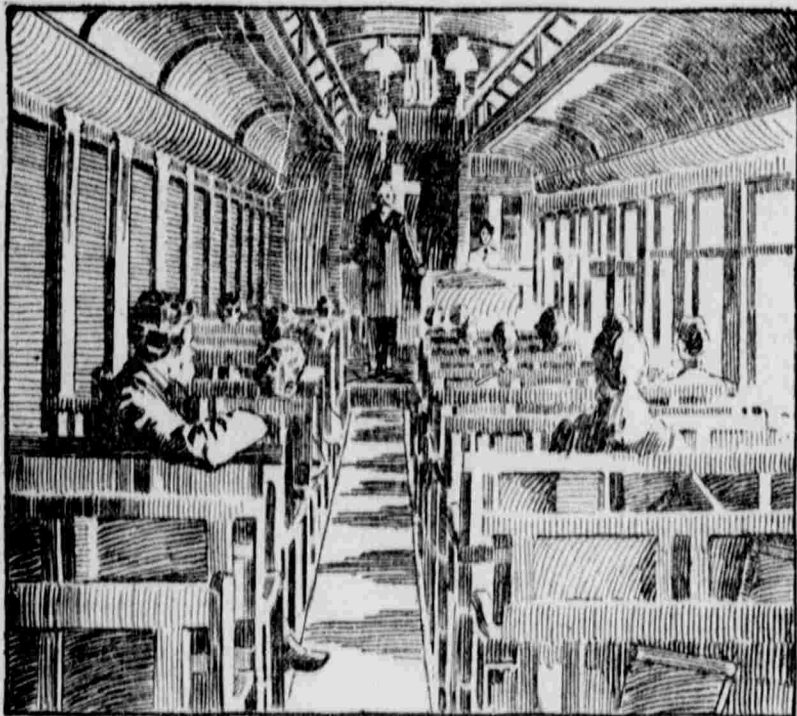
JOE MILLER. (From an old engraving.)

was a popular comedian of the eighteenth century, did not write a single line of the jest book that bears his name. Indeed, when off the stage he was known to crack a joke but once in his life, and that unconsciously. He would sit among his old cronies for hours at a time and, no matter how lively were the shafts of wit, would not so much as smile. A year after Joe's death John Motley, a writer of cheap plays, was commissioned to compile a book of jokes, and it occurred to him that the comedian's name would give the book a good sendoff. Hence its title.

PECULIARITIES OF EYESIGHT.
When the average man or woman comes to be fitted with the first pair of glasses some curious discoveries are made. Seven out of ten have stronger sight in one eye than the other. In two cases out of five one eye is out of line. Nearly one-half of the people are color blind to some extent, and only one pair of eyes out of every fifteen is right in all respects.

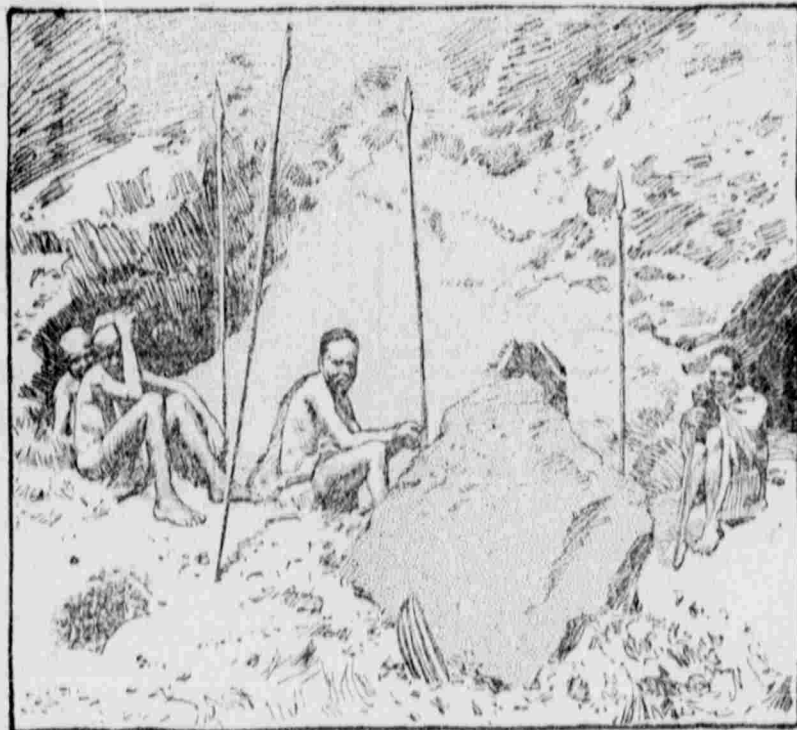
UNIQUE PHASES OF LIFE FROM ALL OVER THE WORLD

A RAILROAD CAR CHAPEL.



The traveling chapel is the latest feature of American railroading. Through the munificence of a little coterie of Wall street magnates several cars have been built for the purpose of carrying the gospel to small villages and settlements which are without a church. The cars, which in addition to the chapel shown in the illustration sleeping and living quarters for the missionaries, are side tracked at the village to which they have been ordered by the American Baptist Publication society of Philadelphia, under whose control they are operated. Should there be too great an attendance to permit of holding service in the chapel itself the car platform is used as a pulpit, and outdoor services are held. The railroads transport these chapel cars free of charge.

A NEW RACE FOUND IN AFRICA.



Herewith is shown a group of the remarkable cave dwellers which Major Powell-Cotton discovered in the wild Mount Elgon country, one of the least known regions of Africa. The caves in which they dwell are partitioned off so as to provide a number of rooms. The headman assured Major Powell-Cotton that the caves were the work of nature, but the explorer noticed distinct traces of tooling and suggested that they were hewn out of the rock by some prehistoric race. When he first went among them the cave dwellers were disposed to be very hostile, but ultimately treated him with the greatest of hospitality.

ODDITIES FROM EVERYWHERE.

The population of Ireland is 4,432,274, and the decrease for the past year has been 16,093.

There are almost as many university teachers in the United States as there are university students in the United Kingdom. The number of professors and instructors at the universities and colleges included in the list of the

United States commissioner of education is 17,000. The number of students in British universities and university colleges is only 20,500.

It will take five years to rebuild the campanile of Venice. The new tower will probably have an elevator.

Dependancy is the chief cause of suicide, and business losses are more

VERY ACTIVE CENTENARIAN.

Professor Elie Metchnikoff, the learned Russian who affirms that nature intends people to live until they are at least 140 years of age, would undoubtedly be delighted to make the acquaintance of Mrs. Mary McDonald, a Pennsylvania colored woman who recently celebrated her one hundred and thirty-third birthday. Mrs. McDonald has



MRS. MARY McDONALD.

been blind for the past two years, but retains her other faculties unimpaired and has an active memory. She was born near Valley Forge and relates incidents of the famous Revolutionary camp as though they occurred but yesterday. The descendants of the Quaker family in which Mrs. McDonald was brought up corroborate many of her statements regarding events in which their forebears played a part.

A REMARKABLE MEMORY.

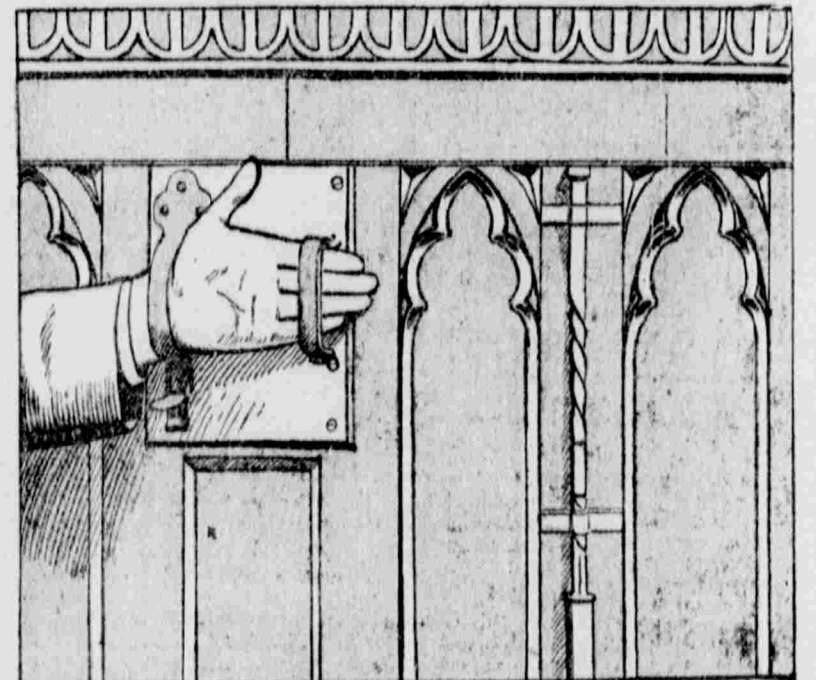
A wealthy South London omnibus proprietor who takes a great interest in his horses is in the habit of personally christening each by name, and although it sometimes occurs that he does not see an animal for over a year, he never fails at once to remember its name. As he is the owner of 500 horses this feat may be acknowledged as a remarkable feat of memory.

EDHEM PASHA, TURKEY'S FAMOUS FIELD MARSHAL.



Herewith is reproduced the latest portrait of Edhem Pasha, who as commander in chief of the Ottoman army in the Greco-Turkish war of 1897 attracted wide attention by his skillful handling of the troops of his command. He mobilized 55,000 troops in three weeks, defeated the Greeks at the Malina pass and entered Larissa. Born in 1831, he first attracted the favorable attention of the Porte during the siege of Plevna in the Russo-Turkish war, and thereafter his promotion was rapid. He is a stranger to fear, and his soldiers dub him the "jolly old pasha," but for all that he is a typical Turk, especially when it comes to dealing with insurgents.

BRANDING TOOLS OF A CENTURY AGO.



The accompanying illustration, made from a photograph recently taken in Lancaster castle, England, bears mute but eloquent testimony to the cruel treatment meted out to criminals convicted of even slight offenses in the "good old times" of a century ago. When a prisoner was condemned he had to undergo branding in addition to his term of imprisonment, and the cruel instruments with which the branding was effected are yet hanging in the dock of the crown court at Lancaster castle. The prisoner's hand was locked in the "hoofdrift," as shown in the illustration, while the jailer, taking the long, hot iron (seen hanging on the right), pressed the end of it to the prisoner's thumb, branding him with an M to let all the world know that he was a malefactor. It is just a century since this barbarous punishment was last inflicted.

A TIM HEALY ANECDOTE.

In his early days Mr. Tim Healy, M. P., was a clerk. First a railway clerk at Newcastle, then a mercantile clerk in London, he began to make his mark as London letter writer to the Nation. Mr. Parnell gave him his chance by taking him as private secretary on his American tour in 1879. He is now the keenest member of the Nationalist party and has had a seat in parliament since 1880. Mr. Healy married a daughter of Mr. T. D. Sullivan, the poet of the Irish Parliamentary party. It is a tale that is told that when leaving his father-in-law's house for the honeymoon he absently picked up Mr. Sullivan's umbrella. "No, no, Tim!" shouted T. D. "Don't take that. I have five daughters, but only one umbrella."

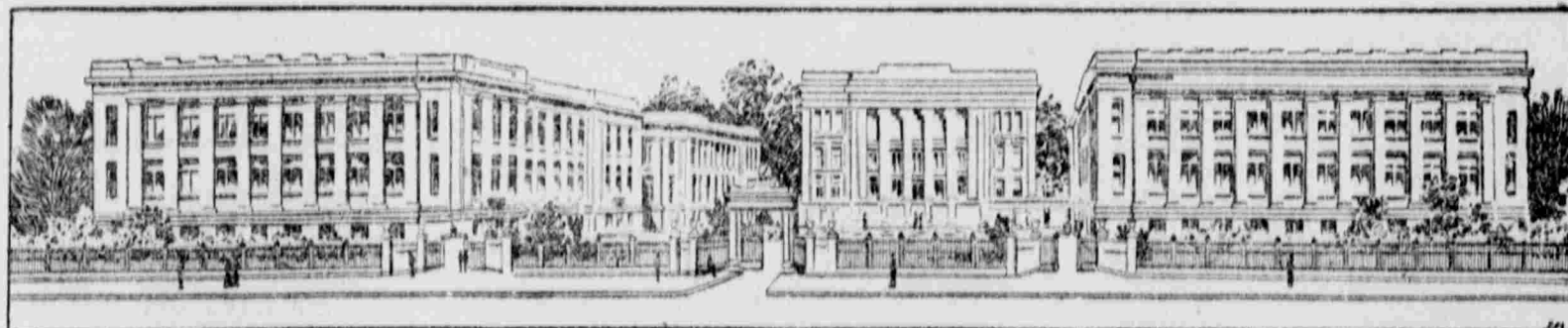
MEASURING AIR RESISTANCE.

An ingenious device has recently been erected on the Eiffel tower in Paris for the purpose of measuring air resistance. The accompanying illustration will give an idea of the modus operandi. A heavy cylindrical weight



slides down a cable stretched from the second platform of the tower to the ground, the cylinder terminating in a cone fitted with a flat plate fixed upon a movable piston rod, which is forced upward by the action of the air. The resistance of the air is thus recorded by the rod, which makes its record in the form of an undulating curve on a registering drum fixed within the cylinder.

HARVARD'S NEW MEDICAL SCHOOL FOR WHICH \$2,000,000 HAS BEEN GIVEN.



The accompanying illustration gives an excellent idea of the appearance of Harvard's new medical college, which it is thought will be completed in about two years. The college was made possible by a gift of \$1,000,000 from J. Pierpont Morgan. The sum needed to bring the undertaking to a successful conclusion—another \$1,000,000—was readily secured from other sources soon after Mr. Morgan's gift was announced. The medical school proper will consist of five buildings, northwest of which is to be a smaller building where instruction in dental medicine will be given, and northeast of the dental building will be the power house. The main buildings surround three sides of a court, entrance being given through an attractive gateway in Longwood avenue. Altogether the site for the college comprises twenty-six acres. All of the buildings are to have light stone exteriors and will be fireproof.

potent factors in driving individuals to commission of rash deeds than ill health, insanity, disappointment in love or strong drink.

A London appendicitis assurance company now issues special policies guaranteeing to holders all the medical, surgical and nursing expenses, up to the amount insured, incurred in an attack of this malady.

Governmental insurance of horses in

Bavaria is eminently satisfactory, as shown by the first annual report of the royal chamber of insurance. The government has conducted the business of insuring cattle against fire and hail for many years.

Wars in the last 5,000 years are supposed to have cost \$600,000,000,000. They say that each man who falls on the battlefield costs \$740 to kill and that the countries of Europe today are pay-

ing to maintain an "armed neutrality" the small sum of \$50 per second.

Orders have recently been executed in Japan for a supply of fishing nets for Alaska valued at \$36,000.

During the last year war caused the death of over 30,000,000 civilized men.

It has been suggested that in view of recent developments in Ionic investigation all matter may be composed

of a single mother substance, protyle. This protyle is supposed to be manufactured by destructive processes from concrete matter in the Crookes tube.

The government printing office spends for lithography and engraving \$240,000 a year.

The United States government chief of ordnance spent \$9,104,098 during the fiscal year.

The average number of visitors in

New York city is estimated at 250,000 daily, and their stay is ten days.

The longest canal in the world is that which extends from the frontier of China to St. Petersburg, 4,472 miles. In India there are 14,000 miles of canals irrigating some 8,000,000 acres of land. The catching of snakes and the collecting of their venom, which fetches \$5 per grain, is a new industry in Australia.